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14. ABSTRACT There are a number of national societies in the Americas dedicated to metallurgical and materials engineering as well as mining and minerals technology in distinct countries. These societies pursue parallel efforts to attend industrial needs and promote training, technical education and scientific research. The Pan American Materials Conference achieved, for the first time, an integration of these leading societies in our continent. Its several (11) symposia permitted interactions of prominent researchers in the most relevant themes and allow collaboration in R & D projects of common interest. The enthusiastic support of this concept by the two organizing societies, TMS					
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## Report Title

Final Report: Funding the Pan American Materials Conference

### ABSTRACT

There are a number of national societies in the Americas dedicated to metallurgical and materials engineering as well as mining and minerals technology in distinct countries. These societies pursue parallel efforts to attend industrial needs and promote training, technical education and scientific research. The Pan American Materials Conference achieved, for the first time, an integration of these leading societies in our continent. Its several (11) symposia permitted interactions of prominent researchers in the most relevant themes and allow collaboration in R&D projects of common interest. The enthusiastic support of this concept by the two organizing societies, TMS (The Metallurgical, Materials, and Minerals Society/AIME) and ABM (Brazilian Society of Metallurgical, Materials, and Minerals) coordination of with the talent and time donated by the organizer of each symposium assured the success of our ambitious event. As the leading society in Brazil, ABM welcomed the sister societies and acknowledged the presence of their representatives and all authors who contributed to the relevance of the Pan American Materials Conference. Over 200 talks/posters were presented and support was provided for two classes of participants: (a) young researchers that do not have sufficient support and (b) senior invited speakers that lend prestige to the event.

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**Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:**

**(a) Papers published in peer-reviewed journals (N/A for none)**

Received

Paper

**TOTAL:**

**Number of Papers published in peer-reviewed journals:**

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**(b) Papers published in non-peer-reviewed journals (N/A for none)**

Received

Paper

**TOTAL:**

**Number of Papers published in non peer-reviewed journals:**

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**(c) Presentations**

Number of Presentations: 0.00

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**Non Peer-Reviewed Conference Proceeding publications (other than abstracts):**

Received      Paper

**TOTAL:**

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

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**Peer-Reviewed Conference Proceeding publications (other than abstracts):**

Received      Paper

**TOTAL:**

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

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**(d) Manuscripts**

Received      Paper

**TOTAL:**

Number of Manuscripts:

Books

Received      Book

TOTAL:

Received      Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

<u>NAME</u>	<u>PERCENT_SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

<u>NAME</u>	<u>PERCENT_SUPPORTED</u>
FTE Equivalent:	
Total Number:	

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### Names of Faculty Supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>	National Academy Member
Naresh Thadhani	0.00	
<b>FTE Equivalent:</b>	<b>0.00</b>	
<b>Total Number:</b>	<b>1</b>	

### Names of Under Graduate students supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
<b>FTE Equivalent:</b>	
<b>Total Number:</b>	

### Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: ..... 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense ..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:..... 0.00

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### Names of Personnel receiving masters degrees

<u>NAME</u>
<b>Total Number:</b>

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### Names of personnel receiving PHDs

<u>NAME</u>
<b>Total Number:</b>

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### Names of other research staff

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
<b>FTE Equivalent:</b>	
<b>Total Number:</b>	

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Sub Contractors (DD882)

**Inventions (DD882)**

**Scientific Progress**

**Technology Transfer**

## **PAN AMERICAN MATERIALS CONFERENCE**

**Sao Paolo, Brazil, July 21-24, 2014**

**PROJECT No. W911NF-14-1-0309**

Naresh Thadhani and Marc Meyers

### **Abstract**

There are a number of national societies in the Americas dedicated to metallurgical and materials engineering as well as mining and minerals technology in distinct countries. These societies pursue parallel efforts to attend industrial needs and promote training, technical education and scientific research. The Pan American Materials Conference achieved, for the first time, an integration of these leading societies in our continent. Its several (11) symposia permitted interactions of prominent researchers in the most relevant themes and allow collaboration in R&D projects of common interest. The enthusiastic support of this concept by the two organizing societies, TMS (The Metallurgical, Materials, and Minerals Society/AIME) and ABM (Brazilian Society of Metallurgical, Materials, and Minerals) coordination of with the talent and time donated by the organizer of each symposium assured the success of our ambitious event. As the leading society in Brazil, ABM welcomed the sister societies and acknowledged the presence of their representatives and all authors who contributed to the relevance of the Pan American Materials Conference. Over 200 talks/posters were presented and support was provided for two classes of participants: (a) young researchers that do not have sufficient support and (b) senior invited speakers that lend prestige to the event.

The Pan American Materials Conference, held in São Paulo, Brazil, was by all measures a great success. On Monday, July 21, prior to the conference, representatives of Materials Societies from Argentina, Chile, Peru, Colombia, Mexico, and the US took part in a meeting hosted by the Brazilian Society of metals, materials, and Minerals which was followed by a luncheon in which they met the Board of Directors of ABM.

What began as a modest but pioneering effort in 2010, along with the 65th Congress of ABM, has now turned into a truly Pan-American event that attracted researchers from a significant number of countries of the Americas. The congress was preceded by a historic meeting at the headquarters of ABM. Representatives from Argentina, Chile, Peru, Mexico, USA and Brazil



showed their societies of materials and decided, after a beautiful lecture by our consortium Pedro Dolabella Portella, describing the FEMS (Federation of European Societies of Materials, of which he was president), support a similar initiative in the Americas. Thus, the seed was planted for a federation. This will need much care to grow and bear fruit, but a new direction was initiated. The functions of this federation include the creation of a forum for high-level investigations in the Americas, and the acceleration of development of new interactions and collaborations across the continent.

The Pan American Conference used a dynamic format with eleven symposia focused on topics of great scientific and technological importance: Materials for energy; Composite and hybrid materials; Biomaterials, smart materials and structures; Mechanical behavior of structural materials; Processing of materials; Modeling and simulation of processes, Microstructures and behavior; Ultrafine grained and nanocrystalline materials and metallic glasses; Dynamic properties of materials; Mineral processing. Among these we highlight the symposium in honor of Robert Mehl. He helped found the ABM in 1944. He was also the supervisor of a brilliant Brazilian student who had an important career in UNIDO, Luis Correia da Silva and of the illustrious Prof. Walter Arno Mannheimer. He spent a year at the University of São Paulo helping metallurgical education in Brazil. Profs. Massalski and Landgraf organized this symposium. Profs. Massalski and Mannheimer, who knew this singular figure, familiarized us with personal and professional aspects of the life of Prof. Mehl. Then followed a brilliant lecture by Prof. Gleiter (Institute of Technology, Karlsruhe, Germany) on a possible connection between classical and quantum mechanics. This territory is still an unknown region in which the two mechanics are governed by different laws coexist. Using experiments with nanoparticles he exploring this regime, from where a possible Nobel Prize will come. Another important contribution on nanotechnology, and which in 2014 was awarded with the Mehl Medal of TMS, was given by Prof. J. Narayan. Followed lectures by great authorities H. Hahn (of the Institute of Technology Karlsruhe, Germany), Michael Kassner of the USA, who explored the inner tensions in plastically deformed metals. Computational work also punctuated the Congress, and Professor Eduardo Bringa Argentina, an authority on this subject, spoke on various aspects of plastic deformation in monolithic and porous metals. This computational method (molecular dynamics) is of great value to a deeper understanding of the mechanisms of deformation by movement of dislocations and twinning. Prof. Murr presented a review of their contributions to dynamic behavior of materials during fifty years dedicated to this work. In the area of biological materials, Daniel Pelaez (Pontifical Bolivarian University, Colombia) presented an interesting lecture on the extraction of keratin from poultry feathers. The development of alloys for biomedical applications magnesium was described by T. Muthiah and associates from several universities in Chile. These are just some of the presentations, which were conspicuous by their quality.

Prof. Sergio Neves Monteiro and Marc Meyers were the co-organizers. The format is inspired by the annual congress of the TMS. The author submits only the summary before the Congress and the selection is made on this basis. Select articles will be published in JMRT, after a rigorous evaluation by auditors. The success of this conference warrants the creation of a Pan American Materials Conference series. TMS has offered to host the next meeting in conjunction with its annual meeting in Nashville, Tennessee (2016). Interest was also demonstrated by Mexico and Argentina, and these will be excellent choices for 2018.

The participants supported with travel grants included the following seven faculty and two graduate students:

Professor L.E. Murr, University of Texas at El Paso

Professor Joseph Poon, University of Virginia

Professor Michael Kessner, University of Southern California

Professor Priya Vashishta, University of Southern California

Professor Terrance Langdon, University of Southern California

Professor Diana Farkas, Virginia Tech

Professor Fernand Marquis, San Diego State University

Ms. Jennifer Breidenich, Graduate student, Georgia Institute of Technology

Mr. Carlos Ruestes, Graduate student, University of Argentina